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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,245	02/09/2004	Yasuharu Sasaki	248707US2	7165

22850 7590 06/19/2008

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EXAMINER	
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ART UNIT	PAPER NUMBER
1792	

NOTIFICATION DATE	DELIVERY MODE
06/19/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/773,245	SASAKI ET AL.	
	Examiner	Art Unit	
	RAKESH K. DHINGRA	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-7,10,12,13,15-25,48 and 49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-7,10,12,13,15-25,48,49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 July 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-3, 5-7, 10, 12, 13 and 15-25 have been considered but are moot in view of the new ground(s) of rejection as explained hereunder.

Applicant has amended independent claims 1, 2, 5, 6 by adding new limitations (e.g. in claim 1 new limitations -"an inner ring member formed of a conductive material, installed to surround the to-be-treated substrate on the mounting table and spaced apart from an outer periphery of the to-be-treated substrate", "an outer", "inner ring member", and "an electrode" etc have been added. In addition applicant has added new claims 48, 49.

Accordingly claims 1-3, 5-7, 10, 12, 13, 15-25, 48 and 49 are now pending and are active.

New reference by Drewery (US 2003/0019582) when combined with Selwyn et al and Koike reads on amended claims 1, 5 limitations including limitations pertaining to an inner ring, an outer ring, and an electrode embedded inside the outer ring . Accordingly claims 1, 5 and dependent claims 2, 3, 6, 7, 48 and 49 have been rejected under 35 USC 103 (a) as explained below. Further, remaining claims 10, 12, 13 and 15-25 have also been rejected under 35 USC 103 (a) as explained below. Applicant's arguments regarding earlier applied references by Selwyn, Koike, O'Donnell and Fakuda not teaching an inner ring and outer ring with an embedded electrode are moot in view of changed grounds of rejection as explained below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 5-7, 48, 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drewery (US 2003/0019582) in view of Selwyn et al (US 5,716,486) and Koike (US 6,726,799).

Regarding Claims 1, 5: Drewery teaches a plasma processing apparatus for performing a processing on a to-be-treated substrate mounted on a mounting table in a processing vessel by a plasma of a processing gas, comprising:

an inner ring 60 member formed of a conductive material, installed to surround the to-be-treated substrate 14 on a mounting table 13 and spaced apart from an outer periphery of the to-be-treated substrate 14;

an outer ring 61 member formed of an insulating material, installed to surround the inner ring member on the mounting table (e.g. Figs 1, 2 and para. 0015, 0033).

Drewery does not teach an electrode embedded inside the outer ring member, and a DC power supply for applying a DC voltage to the electrode, to adjust a plasma sheath region above the outer ring member.

Selwyn et al teach a plasma processing apparatus for performing a processing on a to-be-treated substrate 22 mounted on a mounting table 20 in a processing vessel by plasma of a processing gas comprising:

a focus ring 125 installed to surround the to-be- treated substrate 22 on the electrode assembly 20 and spaced apart from an outer periphery of the substrate 22;

an electrode embedded in the focus ring member 125 along a circumferential direction; and,

a DC power supply 39 for applying a DC voltage to the electrode to adjust plasma sheath. Selwyn et al further teach that by applying a controlled voltage to the electrode embedded in the focus ring, the plasma sheath and the plasma parameters near the wafer region can be controlled (e.g. Fig. 19 and col. 8, line 66 to col. 9, line 13). It would be obvious to provide an embedded electrode in the outer ring of Drewery and apply a controlled voltage to the electrode, as per teaching of Selwyn et al to adjust the plasma sheath and control plasma parameters near the wafer region.

Therefore it would have been obvious to one of ordinary skills in the art at the time of the invention to provide an electrode embedded inside the outer ring as taught by Selwyn et al in the apparatus of Drewery to provide adjustability for the plasma sheath and control plasma parameters near the wafer.

Selwyn et al do not explicitly teach focus ring formed of an insulating material.

However use of insulating material for forming ring is known in the art as per reference cited hereunder.

Koike teaches a plasma apparatus comprising a plasma processing chamber 1 with a lower electrode 2 for supporting a substrate 3 and a focus ring 4 surrounding the substrate 3. Koike further teaches that focus ring is made from an insulating material (e.g. Fig. 1 and col.1, lines 10-30 and col. 2, line 15 to col. 3, line 65).

Therefore it would have been obvious to one of ordinary skills in the art at the time of the invention to form the focus ring from an insulating material as taught by Koike in the apparatus of Drewery in view of Selwyn et al as a known material for forming focus ring.

In this connection courts have ruled:

The selection of a known material based on its suitability for its intended use is prima facie obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Regarding Claims 2, 6: Selwyn et al teach the apparatus includes a controller 96 that controls the voltage to be applied to the buried electrodes (similar to electrode in the outer ring) for control of plasma parameters, based upon input from sensors 95 that give information regarding actual plasma parameters. Further, claim limitation "a first DC voltage is applied to the electrode when a first process is performed on the to-be-treated substrate and a second DC voltage is applied to the electrode when a second process is performed on the to-be-treated substrate" is a functional limitation, and since the apparatus of prior art meets the structural limitations of the claim, the same is considered capable of meeting the functional limitations.

In this connection courts have ruled:

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). Apparatus claims cover what a device is, not what a device does *Hewlett-Packard Co. V. Bausch & Lomb Inc.,* 15USPQ2d 1525, 1528 (Fed. Cir. 1990)

Regarding Claims 3, 7: Claim limitations pertaining to use of apparatus for etching thin films of different thicknesses are intended use limitations and since the apparatus of prior art meets the structural limitations of the claim, the same is considered capable of meeting the intended use limitations.

In this regards courts have ruled (Case law):

"A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987)."

Regarding Claims 48, 49: Selwyn et al teach that similar to the electrode embedded in the focus ring 125, such electrodes if embedded within the lower electrode 20 also provide similar control over plasma configuration, and that a plurality of such electrodes 80, 84 (Fig. 12) can be embedded to enable control of the plasma configuration. Selwyn et al additionally teach plurality of electrodes 90 (Fig. 13, 13a) that can be powered by independent power supplies 92a, 92b whose potential can be regulated (independently controlled) by a controller 96, as per plasma process limitations. It would be obvious to use plurality of electrodes embedded in the focus ring and supplied with independently controlled dc power in view of teachings of Selwyn et al for compensating plasma non-uniformities as per process limitations (e.g. Fig. 13 and col. 8, lines 8-38) {Examiner notes that the claim 48 does not recite location of additional electrodes, and has therefore interpreted that such additional electrodes are located in the focus ring. Applicant is invited to confirm/amend the claim}.

Claims 10, 16-19, 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drewery (US 2003/0019582) in view of Selwyn et al (US 5,716,486) and Koike (US 6,726,799) as applied to Claim 1-3, 5-7, 48, 49 and further in view of O'Donnell et al (US 2005/015,0866) and Harada et al (US 6,771,483).

Regarding Claims 10, 19: Drewery in view of Selwyn et al and Koike teach all limitations of the claim (as already explained above under claim 15) except a film formed on the focus ring and sealing of film by resin.

O'Donnell et al teach an apparatus (Figures 4-6) that includes a focus ring 14 and comprising:

aluminum (base material); and

a film (layer 100) formed by thermal spraying of yttria-containing coating (ceramic) [Paragraphs 0041, 0054, 0057, 0059, 0062-0066].

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use focus ring with ceramic coating as taught by O'Donnell et al in the apparatus of Drewery in view of Selwyn et al and Koike to provide improved wear resistance to physical and /or chemical attack in plasma environment (paragraph 0010).

Drewery in view of Selwyn et al, Koike and O'Donnell et al do not teach at least a portion of thermally sprayed film is sealed by a resin.

Harada et al teach an apparatus comprising a substrate 1 that is coated with upper and lower insulating layers 5, 3 (ceramic - Al203) by spraying process. Harada et al further teach that sealing treatment using a resin may be applied to upper and lower insulating layers 5, 3 to fill the fine pores in the coated layer and improve resistant to plasma environment (e.g. Fig. 10 and col. 4, line 45 to col. 6, line 10).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to seal the layer of ceramic with a resin as taught by Harada et al in the apparatus of Drewery in view Selwyn et al, Koike and O'Donnell et al to fill the fine pores in the sprayed layer and improve resistant to plasma environment.

Regarding Claim 16: O'Donnell et al teach that main layer is formed of Yttria (Y2O3) {Paragraph 0041}.

Regarding Claims 17, 18: O'Donnell et al teach (Figures 4-6) that focus ring 14 comprises aluminum (base material), and a film formed on a surface of the base material, wherein the film has a main layer 100 formed by thermal spraying of yttria-containing coating (ceramic) and an intermediate coating (barrier coat layer) 80 formed of Al2O3 (ceramic) [Paragraphs 0041, 0059, 0062-0066].

Regarding Claims 23, 24: Selwyn et al in view of Koike and O'Donnell et al teach all limitations of the claim (as explained above under claim 10) including that intermediate coating (barrier coat layer) 80 can be formed of polymers like polyimides and polytetrafluoroethylene (PTFE) {engineering plastics} [O'Donnell et al - paragraph 0065].

Regarding Claim 25: O'Donnell et al teach that main layer 100 is formed of Yttria (Y2O3) [0062].

Claims 12, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drewery (US 2003/0019582) in view of Selwyn et al (US 5,716,486), Koike (US 6,726,799), O'Donnell et al (US 2005/0150866) and Harada et al (US 6,771,483) as applied to Claims 10, 16-19, 23-25 and further in view of George et al (US 4,357,387).

Regarding Claims 12, 20: Drewery in view of Selwyn et al, Koike, O'Donnell et al and Harada et al teach all limitations of the claim including barrier coat layer is thermally sprayed film and also teach sealing of thermally sprayed film using a resin.

Drewery in view of Selwyn et al, Koike, O'Donnell et al and Harada et al do not teach resin is selected from the group consisting of SI, PTFE, PI, PAI, PEI, PBI and PFA.

George et al teach sealing of thermally sprayed refractory (includes ceramic) coating using resins to improve surface abrasion and durability of coatings. George et al further teach that sealing resin can be polyimide resin, polyamideimide resin etc (Col. 2, lines 55-65 and Column 7, lines 10-50).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to seal the thermally coated film using resin as taught by George et al in the apparatus of Drewery in view of Selwyn et al, Koike, O'Donnell et al and Harada et al to improve its durability against surface abrasion.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Drewery (US 2003/0019582) in view of Selwyn et al (US 5,716,486) and Koike (US 6,726,799) as applied to Claim 1-3, 5-7, 48, 49 and further in view of O'Donnell et al (US 2005/015,0866) and Fakuda et al (US 2003/0113479).

Regarding Claim 13: Drewery in view of Selwyn et al, Koike and O'Donnell teach all limitations of the claim (as already explained above under claim 10) including a ring member formed from a base material and an Al2O3 film formed on the base material.

Drewery in view of Selwyn et al, Koike and O'Donnell do not teach at least a portion the film is sealed by sol-gel method.

Fakuda et al teach a plasma treatment apparatus (Figure 1) that includes internal members 3a, 3b, 7 that are coated with dielectric layers (thermally sprayed ceramic layers) 4a, 4b, 6. Fakuda et al further teach that a sealing treatment is carried out on top of dielectric layer by sol-gel method to reduce the void volume of the dielectric coating [Paragraphs 0067- 0080, 0098, 0099].

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to seal the thermally sprayed film by sol-gel method as taught by Fakuda et al in the apparatus of Drewery in view of Selwyn et al, Koike and O'Donnell et al to reduce void volume of barrier coating.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Drewery (US 2003/0019582) in view of Selwyn et al (US 5,716,486), Koike (US 6,726,799), O'Donnell et al (US 2005/0150866) and Fakuda et al (US 2003/0113479) as applied to Claim 13 and further in view of Panitz et al (US 5,925,228).

Regarding Claim 15: Drewery in view of Selwyn et al, Koike, O'Donnell et al and Fakuda et al teach all limitations of the claim except that sealing treatment uses a group 3a element.

Panitz et al teach an apparatus (Figures1, 2A-2C) where a Al2O3 – SiO2 (Al is an element from group 3a) solution is used for sol-gel sealing treatment of porous coatings on metallic substrates to control pore size and density of ceramic coatings on the substrate (Column 3, line 5 to Column 4, line 40).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use group 3a element for sealing of coating as taught by Panitz et al in the apparatus

of Drewery in view of Selwyn et al, Koike, O'Donnell et al and Fakuda et al to control pore size and density of ceramic coatings on metal substrates.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Drewery (US 2003/0019582) in view of Selwyn et al (US 5,716,486), Koike (US 6,726,799), O'Donnell et al (US 2005/015,0866) and Harada et al (US 6,771,483) as applied to Claims 10, 16-19, 23-25 and further in view of Fakuda et al (US 2003/0113479).

Regarding Claim 21: Drewery in view of Selwyn et al, Koike, O'Donnell and Harada et al teach all limitations of the claim (as already explained above under claims 10, 17) except that at least a portion the film is sealed by sol-gel method.

Fakuda et al teach a plasma treatment apparatus (Figure 1) that includes internal members 3a, 3b, 7 that are coated with dielectric layers (thermally sprayed ceramic layers) 4a, 4b, 6. Fakuda et al further teach that a sealing treatment is carried out on top of dielectric layer by sol-gel method to reduce the void volume of the dielectric coating [Paragraphs 0067- 0080, 0098, 0099].

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to seal the thermally sprayed film by resin by sol-gel method as taught by Fakuda et al in the apparatus of Drewery in view of Selwyn et al, Koike, O'Donnell et al and Harada et al to reduce void volume of barrier coating.

Claims 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Drewery (US 2003/0019582) in view of Selwyn et al (US 5,716,486), Koike (US 6,726,799), O'Donnell

et al (US 2005/0150866), Harada et al (US 6,771,483) and Fakuda et al (US 2003/0113479) as applied to Claim 21 and further in view of Panitz et al (US 5,925,228).

Regarding Claims 22: Drewery in view of Selwyn et al, Koike, O'Donnell et al, Harada et al and Fakuda et al teach all limitations of the claim except that sealing treatment uses a group 3a element.

Panitz et al teach an apparatus (Figures1, 2A-2C) where a Al2O3 – SiO2 (Al is an element from group 3a) solution is used for sol-gel sealing treatment of porous coatings on metallic substrates to control pore size and density of ceramic coatings on the substrate (Column 3, line 5 to Column 4, line 40).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use group 3a element for sealing of coating as taught by Panitz et al in the apparatus of Drewery in view of Selwyn et al, Koike, O'Donnell et al, Harada et al and Fakuda et al to control pore size and density of ceramic coatings on metal substrates.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAKESH K. DHINGRA whose telephone number is (571)272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Rakesh K Dhingra/
Examiner, Art Unit 1792

/Karla Moore/
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